

GEOLOGY (GEOL)

Courses

GEOL 109 VOLCANOES AND EARTHQUAKES (3)

The geological origin, occurrence, and hazards of volcanoes and earthquakes. Plate tectonic theory, efforts at forecasting these events, and effects on human populations will be discussed. Core: Biological & Physical Sciences.

GEOL 121 PHYSICAL GEOLOGY (4)

Composition and structure of the earth, the internal and external forces acting upon it, and the surface features resulting. Laboratory studies of common rocks and minerals, geologic and topographic maps, and aerial photographs. Field trips required. Three lecture hours and three laboratory hours per week. Students who have successfully completed the honors version of this course (GEOL 122) will not receive additional credit for this course. Core: Biological & Physical Sciences. Lab/Class fee will be assessed.

GEOL 122 HONORS PHYSICAL GEOLOGY (4)

Composition and structure of the earth; the internal and external forces acting upon it and the surface features resulting. Laboratory studies of common rocks and minerals, geologic and topographic maps and aerial photographs. Field trips required. Three lecture hours and three laboratory hours per week. Honors College course. Students who have successfully completed the non-honors version of this course will not receive additional credit for this course. Prerequisite: Honors College. Core: Biological & Physical Sciences and Science Lab. Lab/Class fee will be assessed.

GEOL 123 HISTORICAL GEOLOGY (4)

The history and development of the continents and ocean basins and the evolution of life on earth will be discussed based upon information obtained from the sedimentary rock record. Field trips required. Three lecture hours and three laboratory hours per week. Prerequisite: GEOL 121. Core: Biological & Physical Sciences and Science Lab. Lab/Class fee will be assessed.

GEOL 301 SUSTAINABILITY AND THE USE OF NATURAL RESOURCES (3)

Students will develop a scientific understanding of origin, use, and environmental impact of renewable and non-renewable natural resources. Examines the science behind the policies governing use and conservation of natural resources as well as the impacts associated with overuse of those resources. Topics will include exploration and development of both non-renewable and renewable energy resources and strategic mineral resources and the management and protection of water, air and soil. Prerequisite: GEOL 121.

GEOL 305 ENVIRONMENTAL GEOLOGY (4)

Earth's natural surface systems (hydrologic, atmospheric, and climatic): causes and extent of human modifications; effects and potential solutions to resulting problems. Introduction to standard field and laboratory methods in environmental geology. Field trips required. Three lecture hours and three lab hours. Prerequisite: GEOL 121. Lab/Class fee will be assessed.

GEOL 307 PALEONTOLOGY (3)

Designed to introduce the basic principles of paleontology. Topics to be covered include: preservation and the processes of fossilization; fidelity and the quality of the fossil record; principles of evolution as evidenced by the fossil record; taxonomy and the recognition and naming of fossil species; biostratigraphy as a means of dating rocks; fossils as a means of reconstructing ancient environments; and extinction and its role in shaping the history of life. The course will include hands-on experiences and a mandatory weekend field trip. This course has been offered as a special topic; students who have earned credit for this course as a special topic will not receive additional credit for GEOL 307. Prerequisites: GEOL 123 or BIOL 202 or BIOL 206 /BIOL 206L.

GEOL 321 STRUCTURAL GEOLOGY (4)

The identification and analysis of tectonic forms to determine the physical conditions of formation and the context of historical geological events in which they occur. Field trips required. Three lecture hours and three laboratory hours. Prerequisites: GEOL 121 and PHYS 211 or PHYS 241. Lab/Class fee will be assessed.

GEOL 331 MINERALOGY (4)

The study of minerals with emphasis on crystallography, crystal chemistry, and chemical-structural classification. Laboratory identification of minerals in hand specimen, in thin section by application of principles of optical mineralogy, by chemical analysis, and by X-ray diffraction analysis. Three lecture hours and three laboratory hours. Prerequisites: GEOL 121 and CHEM 131/ CHEM 131L. Lab/Class fee will be assessed.

GEOL 333 PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS (4)

Study of the properties and genesis of two major rock groups. Megascopic and microscopic techniques in rock classification. Environments of formation. Case studies from the Maryland Piedmont. Field trips required. Three lecture hours and three laboratory hours. Prerequisite: GEOL 331. Lab/Class fee will be assessed.

GEOL 357 OCEANOGRAPHY (3)

Physical, chemical, and geologic characteristics of ocean basins, boundaries, and sea water including origin and behavior of waves and currents. Prerequisites: 7 units of BIOL, CHEM, GEOL, or PHYS courses; at least one of the courses must be a lecture/lab course or include a corresponding lab.

GEOL 410 METHODS FOR ENVIRONMENTAL GEOCHEMISTRY (4)

Students will develop an understanding of fate, transport and cycling of geochemically important elements in the environment including natural and anthropogenic sources and their physical and chemical modes of transport in near surface environments. Students will learn basic geochemical and analytical methods applicable to investigations in soils and surface waters. Field trips required. Three lecture hours and three laboratory hours. Prerequisites: GEOL 121, CHEM 131, CHEM 132 or consent of the instructor. Lab/Class fee will be assessed.

GEOL 415 HYDROGEOLOGY (4)

Geologic aspects of groundwater: origin, occurrence, and movement. Field trips required. Three lecture hours and three laboratory hours. Prerequisites: CHEM 132/CHEM 132L (CHEM 111), PHYS 211 or PHYS 241. Lab/Class fee will be assessed.

GEOL 421 TECTONICS (3)

Motions and deformation of the earth on a regional to global scale; historical development of plate tectonic theory; case studies from the historic and current geological literature. Course pedagogy combines lecture and student-led discussions. Prerequisites: 16 units of GEOL courses or consent of instructor.

GEOL 443 SEDIMENTOLOGY AND STRATIGRAPHY (4)

Production, transport, and deposition of sediments and sedimentary bodies for the development of facies models useful in interpretation of the stratigraphic record. Three lecture hours and three laboratory hours. Field trips required. Prerequisites: GEOL 121, CHEM 131/CHEM 131L. Lab/Class fee will be assessed.

GEOL 470 SPECIAL TOPICS IN GEOLOGY (1-4)

The study of special topics in the Geosciences. Special Topics will be determined by their need for study and relevance to existing courses. May be repeated with a different topic for a maximum of 6 units.

GEOL 489 INTRODUCTION TO RESEARCH (1)

Developing a research question, designing research projects, writing a proposal, scientific report writing, and oral presentation. As a final project, students develop a research proposal. Graded S/U. Prerequisites: GEOL 121, GEOL 123, and 8 additional GEOL units, or consent of the instructor.

GEOL 490 INDEPENDENT RESEARCH IN GEOLOGY (1-4)

Individual and supervised research in selected areas of Geosciences. Topics may be laboratory or field based. May be repeated for a maximum of 6 units. Up to 3 units of GEOL 490 can be counted as GEOL elective units with the experience culminating in a public oral or poster presentation or equivalent. The presentation should be given in the semester that the 3rd unit of GEOL 490 is taken. Prerequisite: consent of instructor.

GEOL 491 DIRECTED READINGS (1-4)

Independent reading in an area selected by the student in consultation with the instructor. May be repeated for a maximum of 6 units.

GEOL 492 GEOLOGICAL FIELD METHODS (3)

Introduction to geologic mapping and field techniques. Skills covered include: reading and using topographic and geologic maps; creating and interpreting geologic cross sections and geologic maps; using compass and map to take compass bearings and triangulate location; identifying geologic structures and contacts in the field; practice with various field techniques for collecting geological data; collecting, recording, and managing data sets; communicating results in written and graphical form. Field trips required. Prerequisites: at least 16 hours of geology units completed or instructor consent.

GEOL 494 TRAVEL STUDY (1-3)

Investigation of field problems and phenomena. May be repeated for a maximum of 3 units.

GEOL 495 RESEARCH PROBLEMS IN GEOLOGY (1-2)

Design and successful completion of a geological research project based on a problem of regional significance. Scope of project determines course credit selected. Project results will be presented in a public forum. Prerequisites: GEOL 121, GEOL 123, GEOL 489 and two additional upper level GEOL courses.

GEOL 499 HONORS THESIS IN GEOLOGY (1-4)

Writing of an honors thesis based on independent research done under the direction of a staff member. May be repeated for a maximum of six units. Prerequisites: consent of department and open only to advanced honors candidates.